WHAT IS CLAIMED IS:

1. A spectral processing method for compensating a plurality of sequential spectra and profiles derived therefrom for effects of drift comprising:

transforming a plurality of sequential spectra obtained from a spectrometer to provide an array of drift-compensated row vectors, wherein the array of drift-compensated row vectors constitutes a drift-compensated array;

performing a principal-factor determination on the drift-compensated array to provide a set of drift-compensated principal factors; and

generating drift-compensated scaled target-factor profiles from a profile trajectory of the drift-compensated row vectors lying within a space of drift-compensated principal factors.

2. The spectral processing method of claim 1 further comprising generating drift-compensated compositional profiles from the drift-compensated scaled target-factor profiles.

3. The spectral processing method of claim 1, wherein the transforming the plurality of sequential spectra further comprises:

inputting a plurality of sequential spectra from a spectrometer into a computer system;

ordering the spectra in a primal array of row vectors, wherein each sequential spectrum constitutes a successive row vector of the primal array; and

removing phase factors due to drift using a dephasing procedure that transforms the primal array into a drift-compensated array.

4. The spectral processing method of claim 3 wherein the dephasing procedure for transforming the primal array into the drift-compensated array further comprises applying a Fourier transform to the spectra in the primal array of row vectors forming an array of Fourier-transformed row vectors, multiplying each Fourier-transformed row vector by a complex conjugate of each Fourier-transformed row vector to form a squared moduli vector thereby removing phase factors due to drift, taking the square root of each element of the squared moduli vector to create a corresponding moduli vector, and forming a drift-compensated array of moduli vectors by successively sequencing the moduli vectors as successive drift-compensated row vectors in a drift-compensated array, wherein the moduli vectors constitute moduli of Fourier-transformed spectra.

5. The spectral processing method of claim 4 further comprising outputting the drift-compensated row vectors of the drift-compensated array as a sequential series of moduli of Fourier-transformed spectra.

6. The spectral processing method of claim 3 wherein the dephasing procedure for transforming the primal array into the drift-compensated array further comprises applying a fitting procedure to each spectrum in the primal array using selected reference spectra, calculating through the fitting procedure a corresponding reference weighting factor for each reference spectrum corresponding to each spectrum in the primal array, removing the phase factor due to drift from each spectrum in the primal array by synthesizing a corresponding drift-compensated spectrum given by the sum of each selected reference spectrum multiplied by the

corresponding reference weighting factor, and forming a drift-compensated array by successively sequencing the drift-compensated spectra as successive drift-compensated row vectors in the drift-compensated array.

7. The spectral processing method of claim 6 further comprising outputting analytical results selected from the group consisting of the selected reference spectra used in the fitting procedure, the drift-compensated row vectors of the drift-compensated array as a sequential series of drift-compensated spectra, reference weighting factors for each reference spectrum corresponding to each spectrum in the primal array as a set of drift-compensated reference-spectrum profiles, and phase factors due to drift for each reference spectrum corresponding to each spectrum in the primal array as a set of phase-factor profiles.

8. The spectral processing method of claim 1 wherein the performing the principal-factor determination comprises performing a factor analysis.

9. The spectral processing method of claim 8, wherein the performing the factor analysis further comprises:

forming a covariance array from the drift-compensated array;

applying an eigenanalysis to the covariance array to define a complete set of eigenvectors and eigenvalues; and

defining a set of drift-compensated principal factors by selecting a subset of eigenvectors from the complete set of eigenvectors.

10. The spectral processing method of claim 9, wherein the defining the

set of drift-compensated principal factors further comprises selecting the drift-compensated principal factors as a first few eigenvectors corresponding to eigenvalues above a certain limiting value.

11. The spectral processing method of claim 1 wherein the performing the principal-factor determination comprises performing a linear-least-squares analysis.

12. The spectral processing method of claim 11, wherein the performing a linear-least-squares analysis further comprises:

selecting a set of initial factors from the set of drift-compensated row vectors of the drift-compensated array;

performing a linear-least-squares decomposition with the set of initial factors on the drift-compensated row vectors in the drift-compensated array to provide a set of residue factors; and

performing a Gram-Schmidt orthonormalization on the combined set of initial factors and residue factors to provide drift-compensated principal factors.

13. The spectral processing method of claim 1, wherein the generating drift-compensated scaled target-factor profiles further comprises:

constructing a set of drift-compensated target factors on a space of the drift-compensated principal factors;

applying the set of drift-compensated target factors to a profile trajectory lying within a space of drift-compensated principal factors to obtain a sequential set of target-factor weighting factors corresponding to the drift-compensated target factors

for the profile trajectory; and

outputting analytical results selected from the group consisting of a set of drift-compensated scaled target-factor profiles derived from the set of target-factor weighting factors, and the set of drift-compensated target factors.

14. The spectral processing method of claim 13, wherein the constructing the set of drift-compensated target factors further comprises:

generating a profile trajectory on a 3-dimensional projection of a 4-dimensional space of a set of first-four, drift-compensated principal factors along with a reference tetrahedron the vertices of which represent each of the first-four, drift-compensated principal factors;

enclosing the profile trajectory within an enclosing tetrahedron with vertices centered on end-points and in proximity to turning points of the profile trajectory, and with faces lying essentially tangent to portions of the profile trajectory; and

calculating the drift-compensated target factors from the normed coordinates of the vertices of the enclosing tetrahedron in terms of the drift-compensated principal factors.

15. The spectral processing method of claim 14, wherein the generating the profile trajectory further comprises:

calculating 4-space coordinates of a profile trajectory of drift-compensated target-factor profiles on a 4-dimensional space to produce four coordinates for each point in the profile trajectory, one coordinate for each of the first-four, drift-compensated principal factors;

reducing the dimensionality of the coordinates of the profile trajectory by dividing each coordinate by a sum of all four 4-space coordinates to produce normed coordinates for the profile trajectory; and,

plotting the normed coordinates for the profile trajectory in a 3-dimensional space the coordinate axes of which are edges of a reference tetrahedron, the vertices of which correspond to unit values for each of the first-four, drift-compensated principal factors in a manner analogous to plotting of coordinates on a quaternary phase diagram.

16. The spectral processing method of claim 13, wherein generating drift-compensated compositional profiles comprises:

defining a set of drift-compensated scaled target-factor profile values as the set of scaled target-factor weighting factors;

dividing each drift-compensated scaled target-factor profile value by a profile sensitivity factor for each constituent corresponding to the target factor to provide a sensitivity-scaled target-factor profile value;

normalizing the sensitivity-scaled target-factor profile value by dividing each sensitivity-scaled target-factor profile value for a given cycle number by the sum of all the sensitivity-scaled target-factor profile values for the given cycle number to provide drift-compensated compositional profile values at the given cycle number; and

outputting the drift-compensated compositional profile values as a set of drift-compensated compositional profiles.

17. A waveform processing method for compensating a plurality of sequential waveforms and profiles derived therefrom for effects of drift comprising:

transforming a plurality of sequential waveforms obtained from a waveform-source device to provide an array of drift-compensated row vectors, wherein the array of drift-compensated row vectors constitutes a drift-compensated array;

performing a principal-factor determination on the drift-compensated array to provide a set of drift-compensated principal factors; and

generating drift-compensated scaled target-factor profiles from a profile trajectory of the drift-compensated row vectors lying within a space of drift-compensated principal factors .

18. The waveform processing method of claim 17, wherein the transforming the plurality of sequential waveforms further comprises:

inputting a plurality of sequential waveforms from a waveform-source device into a computer system;

ordering the waveforms in a primal array of row vectors, wherein each sequential waveform constitutes a successive row vector of the primal array; and

removing phase factors due to drift using a dephasing procedure that transforms the primal array into a drift-compensated array.

19. The waveform processing method of claim 18 wherein the dephasing procedure for transforming the primal array into the drift-compensated array further comprises applying a Fourier transform to the waveforms in the primal array of row

vectors forming an array of Fourier-transformed row vectors, multiplying each Fourier-transformed row vector by a complex conjugate of each Fourier-transformed row vector to form a squared moduli vector thereby removing phase factors due to drift, taking the square root of each element of the squared moduli vector to create a corresponding moduli vector, and forming a drift-compensated array of moduli vectors by successively sequencing the moduli vectors as successive drift-compensated row vectors in a drift-compensated array, wherein the moduli vectors constitute moduli of Fourier-transformed waveforms.

20. The waveform processing method of claim 19 further comprising outputting the drift-compensated row vectors of the drift-compensated array as a sequential series of moduli of Fourier-transformed waveforms.

21. The waveform processing method of claim 18, wherein the dephasing procedure for transforming the primal array into the drift-compensated array further comprises applying a fitting procedure to each sequential waveform in the primal array using selected reference waveforms, calculating through the fitting procedure a corresponding reference weighting factor for each reference waveform corresponding to each waveform in the primal array, removing the phase factor due to drift from each waveform in the primal array by synthesizing a corresponding drift-compensated waveform given by the sum of each selected reference waveform multiplied by the corresponding reference weighting factor, and forming a drift-compensated array by successively sequencing the drift-compensated waveforms as successive drift-compensated row vectors in the drift-compensated array.

22. The waveform processing method of claim 21 further comprising outputting analytical results selected from the group consisting of the selected reference waveforms used in the fitting procedure, the drift-compensated row vectors of the drift-compensated array as a sequential series of drift-compensated waveforms, reference weighting factors for each reference waveform corresponding to each waveform in the primal array as a set of drift-compensated reference-waveform profiles, and phase factors due to drift for each reference waveform corresponding to each waveform in the primal array as a set of phase-factor profiles.

23. The waveform processing method of claim 17 wherein the performing the principal-factor determination comprises performing a factor analysis.

24. The waveform processing method of claim 23, wherein the performing the factor analysis further comprises:

forming a covariance array from the drift-compensated array;

applying an eigenanalysis to the covariance array to define a complete set of eigenvectors and eigenvalues; and

defining a set of drift-compensated principal factors by selecting a subset of eigenvectors from the complete set of eigenvectors.

25. The waveform processing method of claim 24, wherein the defining the set of drift-compensated principal factors further comprises selecting the drift-compensated principal factors as a first few eigenvectors corresponding to eigenvalues above a certain limiting value.

26. The waveform processing method of claim 17 wherein the performing the principal-factor determination comprises performing a linear-least-squares analysis.

27. The waveform processing method of claim 26, wherein the performing a linear-least-squares analysis further comprises:

selecting a set of initial factors from the set of drift-compensated row vectors of the drift-compensated array;

performing a linear-least-squares decomposition with the set of initial factors on the drift-compensated row vectors in the drift-compensated array to provide a set of residue factors; and

performing a Gram-Schmidt orthonormalization on the combined set of initial factors and residue factors to provide drift-compensated principal factors.

28. The waveform processing method of claim 17, wherein the generating drift-compensated scaled target-factor profiles further comprises:

constructing a set of drift-compensated target factors on a space of the drift-compensated principal factors;

applying the set of drift-compensated target factors to a profile trajectory lying within a space of drift-compensated principal factors to obtain a sequential set of target-factor weighting factors corresponding to the drift-compensated target factors for the profile trajectory; and

outputting analytical results selected from the group consisting of a set of drift-compensated scaled target-factor profiles derived from the set of target-factor

weighting factors, and the set of drift-compensated target factors.

29. The waveform processing method of claim 28, wherein the constructing the set of drift-compensated target factors further comprises:

generating a profile trajectory on a 3-dimensional projection of a 4-dimensional space of a set of first-four, drift-compensated principal factors along with a reference tetrahedron the vertices of which represent each of the first-four, drift-compensated principal factors;

enclosing the profile trajectory within an enclosing tetrahedron with vertices centered on end-points and in proximity to turning points of the profile trajectory, and with faces lying essentially tangent to portions of the profile trajectory; and

calculating the drift-compensated target factors from the normed coordinates of the vertices of the enclosing tetrahedron in terms of the drift-compensated principal factors.

30. The waveform processing method of claim 29, wherein the generating the profile trajectory further comprises:

calculating 4-space coordinates of a profile trajectory of drift-compensated target-factor profiles on a 4-dimensional space to produce four coordinates for each point in the profile trajectory, one coordinate for each of the first-four, drift-compensated principal factors;

reducing the dimensionality of the coordinates of the profile trajectory by dividing each coordinate by a sum of all four 4-space coordinates to produce normed

coordinates for the profile trajectory; and,

plotting the normed coordinates for the profile trajectory in a 3-dimensional space the coordinate axes of which are edges of a reference tetrahedron, the vertices of which correspond to unit values for each of the first-four, drift-compensated principal factors in a manner analogous to plotting of coordinates on a quaternary phase diagram.

31. An apparatus for compensating a plurality of sequential spectra and profiles derived therefrom for effects of drift comprising a spectroscopic analysis system, wherein the spectroscopic analysis system comprises:

a spectrometer; and

a computer system, coupled to the spectrometer, for analyzing spectra input from the spectrometer, the computer system further comprising a spectral processor for compensating a plurality of sequential spectra and profiles derived therefrom for effects of drift.

32. The apparatus of claim 31, wherein the spectrometer comprises an electron spectrometer.

33. The apparatus of claim 32, wherein the electron spectrometer comprises an Auger spectrometer.

34. The apparatus of claim 32, wherein the electron spectrometer comprises an x-ray photoelectron spectrometer.

35. The apparatus of claim 32, wherein the electron spectrometer comprises an electron energy loss spectrometer.

36. The apparatus of claim 31, wherein the spectral processor further comprises:

a spectral transformer operating on a plurality of sequential spectra obtained from the spectrometer to provide an array of drift-compensated row vectors, wherein the array of drift-compensated row vectors constitutes a drift-compensated array;

a principal-factor determinator operating on the drift-compensated array to provide a set of drift-compensated principal factors; and

a profile generator operating on a profile trajectory of the drift-compensated row vectors lying within a space of drift-compensated principal factors to provide a set of drift-compensated scaled target-factor profiles.

37. The apparatus of claim 36, wherein the profile generator operating on the set drift-compensated scaled target-factor profiles generates a set of drift-compensated compositional profiles.

38. The apparatus of claim 36, wherein the spectral transformer accepts as input the plurality of sequential spectra obtained from the spectrometer into the computer system, orders the spectra in a primal array, wherein each sequential spectrum constitutes a successive row vector of the primal array, and removes phase factors due to drift using a dephasor that transforms the primal array into a drift-compensated array.

39. The apparatus of claim 38, wherein the dephasor that transforms the primal array into the drift-compensated array applies a Fourier transform to the spectra in the primal array of row vectors to form an array of Fourier-transformed row vectors, multiplies each Fourier-transformed row vector by a complex conjugate of each Fourier-transformed row vector to form a squared moduli vector thereby removing phase factors due to drift, takes the square root of each element of the squared moduli vector to create a corresponding moduli vector, and forms a drift-compensated array of moduli vectors by successively sequencing the moduli vectors as successive drift-compensated row vectors in a drift-compensated array, wherein the moduli vectors constitute moduli of Fourier-transformed spectra.

40. The apparatus of claim 39 wherein the spectral transformer outputs to an output device the drift-compensated row vectors of the drift-compensated array as a sequential series of moduli of Fourier-transformed spectra.

41. The apparatus of claim 38, wherein the dephasor that transforms the primal array into the drift-compensated array fits each spectrum in the primal array using selected reference spectra, calculates a corresponding reference weighting factor for each reference spectrum corresponding to each spectrum in the primal array, synthesizes a corresponding drift-compensated spectrum given by the sum of each selected reference spectrum multiplied by the corresponding reference weighting factor thereby removing phase factors due to drift, and forms a drift-compensated array by successively sequencing the drift-compensated spectra as successive drift-compensated row vectors in the drift-compensated array.

42. The apparatus of claim 41 wherein the spectral transformer outputs to an output device analytical results selected from the group consisting of the selected reference spectra used in the fitting procedure, the drift-compensated row vectors of the drift-compensated array as a sequential series of drift-compensated spectra, reference weighting factors for each reference spectrum corresponding to each spectrum in the primal array as a set of drift-compensated reference-spectrum profiles, and phase factors due to drift for each reference spectrum corresponding to each spectrum in the primal array as a set of phase-factor profiles.

43. The apparatus of claim 36 wherein the principal-factor determinator comprises a factor analyzer.

44. The apparatus of claim 43, wherein the factor analyzer forms a covariance array from the drift-compensated array, applies an eigenanalysis to the covariance array to define a complete set of eigenvectors and eigenvalues, and defines a set of drift-compensated principal factors as a subset of eigenvectors determined by a selector operating on the complete set of eigenvectors.

45. The apparatus of claim 44, wherein the selector operates on the complete set of eigenvectors to define the set of drift-compensated principal factors as a first few eigenvectors corresponding to eigenvalues above a certain limiting value.

46. The apparatus of claim 36 wherein the principal-factor determinator comprises a linear-least-squares analyzer.

47. The apparatus of claim 46, wherein the linear-least-squares analyzer selects a set of initial factors from the set of drift-compensated row vectors of the drift-compensated array, performs a linear-least-squares decomposition with the set of initial factors on the drift-compensated row vectors in the drift-compensated array to provide a set of residue factors, and performs a Gram-Schmidt orthonormalization on the combined set of initial factors and residue factors to provide drift-compensated principal factors.

48. The apparatus of claim 36, wherein the profile generator defines a set of drift-compensated target factors on a space of the drift-compensated principal factors determined by a target-factor constructor operating on the drift-compensated principal factors, applies the set of drift-compensated target factors to a profile trajectory lying within a space of drift-compensated principal factors to obtain a sequential set of target-factor weighting factors corresponding to the drift-compensated target factors for the profile trajectory, and outputs to an output device analytical results selected from the group consisting of a set of drift-compensated scaled target-factor profiles derived from the set of target-factor weighting factors, and the set of drift-compensated target factors.

49. The apparatus of claim 48, wherein the target-factor constructor generates a profile trajectory on a 3-dimensional projection of a 4-dimensional space of a set of first-four, drift-compensated principal factors along with a reference tetrahedron the vertices of which represent each of the first-four, drift-compensated principal factors; encloses the profile trajectory within an enclosing tetrahedron with vertices centered on

end-points and in proximity to turning points of the profile trajectory, and with faces lying essentially tangent to portions of the profile trajectory; and calculates the drift-compensated target factors from the normed coordinates of the vertices of the enclosing tetrahedron in terms of the drift-compensated principal factors.

50. The apparatus of claim 49, wherein the target-factor constructor in generating the profile trajectory further calculates 4-space coordinates of a profile trajectory of drift-compensated target-factor profiles on a 4-dimensional space to produce four coordinates for each point in the profile trajectory, one coordinate for each of the first-four, drift-compensated principal factors; reduces the dimensionality of the coordinates of the profile trajectory by dividing each coordinate by a sum of all four 4-space coordinates to produce normed coordinates for the profile trajectory; and, plots the normed coordinates for the profile trajectory in a 3-dimensional space the coordinate axes of which are edges of a reference tetrahedron the vertices of which correspond to unit values for each of the first-four, drift-compensated principal factors in a manner analogous to plotting of coordinates on a quaternary phase diagram.

51. The apparatus of claim 48, wherein the profile generator further defines a set of drift-compensated scaled target-factor profile values as the set of scaled target-factor weighting factors, divides each drift-compensated scaled target-factor profile value by a profile sensitivity factor for each constituent corresponding to the target factor to provide a sensitivity-scaled target-factor profile value, divides each sensitivity-scaled target-factor profile value for a given cycle number by the sum of all the sensitivity-

scaled target-factor profile values for the given cycle number to provide drift-compensated compositional profile values at the given cycle number, and outputs the drift-compensated compositional profile values as a set of drift-compensated compositional profiles.

52. An apparatus for compensating a plurality of sequential waveforms and profiles derived therefrom for effects of drift, comprising a waveform analysis system, wherein the waveform analysis system comprises:

a waveform-source device; and

a computer system, coupled to the waveform-source device, for analyzing waveforms input from the waveform-source device, the computer system further comprising a waveform processor for compensating a plurality of sequential waveforms and profiles derived therefrom for effects of drift.

53. The apparatus of claim 52, wherein the waveform processor further comprises:

a waveform transformer operating on a plurality of sequential waveforms obtained from a waveform-source device to provide an array of drift-compensated row vectors, wherein the array of drift-compensated row vectors constitutes a drift-compensated array;

a principal-factor determinator operating on the drift-compensated array to provide a set of drift-compensated principal factors; and

a profile generator operating on a profile trajectory of the drift-compensated row vectors lying within a space of drift-compensated principal factors to provide a set of drift-compensated scaled target-factor profiles.

54. The apparatus of claim 53, wherein the waveform transformer accepts as input the plurality of sequential waveforms obtained from a waveform-source device into the computer system, orders the waveforms in a primal array, wherein each sequential waveform constitutes a successive row vector of the primal array, and removes phase factors due to drift using a dephasor that transforms the primal array into a drift-compensated array.

55. The apparatus of claim 54, wherein the dephasor that transforms the primal array into the drift-compensated array applies a Fourier transform to the primal array of row vectors to form an array of Fourier-transformed row vectors, multiplies each Fourier-transformed row vector by a complex conjugate of each Fourier-transformed row vector to form a squared moduli vector thereby removing phase factors due to drift, takes the square root of each element of the squared moduli vector to create a corresponding moduli vector, and forms a drift-compensated array of moduli vectors by successively sequencing the moduli vectors as successive drift-compensated row vectors in a drift-compensated array, wherein the moduli vectors constitute moduli of Fourier-transformed waveforms.

56. The apparatus of claim 55 wherein the waveform transformer outputs the drift-compensated row vectors of the drift-compensated array as a sequential series of moduli of Fourier-transformed waveforms.

57. The apparatus of claim 54, wherein the dephasor that transforms the primal array into the drift-compensated array fits each waveform in the primal array using selected reference waveforms, calculates a corresponding reference weighting factor for each reference waveform corresponding to each waveform in the primal array, synthesizes a corresponding drift-compensated waveform given by the sum of each selected reference waveform multiplied by the corresponding reference weighting factor thereby removing phase factors due to drift, and forms a drift-compensated array by successively sequencing the drift-compensated waveforms as successive drift-compensated row vectors in the drift-compensated array.

58. The apparatus of claim 57 wherein the waveform transformer outputs to an output device analytical results selected from the group consisting of the selected reference waveforms used in the fitting procedure, the drift-compensated row vectors of the drift-compensated array as a sequential series of drift-compensated waveforms, reference weighting factors for each reference waveform corresponding to each waveform in the primal array as a set of drift-compensated reference-waveform profiles, and phase factors due to drift for each reference waveform corresponding to each waveform in the primal array as a set of phase-factor profiles.

59. The apparatus of claim 53 wherein the principal-factor determinator comprises a factor analyzer.

60. The apparatus of claim 59, wherein the factor analyzer forms a covariance array from the drift-compensated array, applies an eigenanalysis to the covariance array to define a complete set of eigenvectors and eigenvalues, and defines a set of drift-compensated principal factors as a subset of eigenvectors determined by a selector operating on the complete set of eigenvectors.

61. The apparatus of claim 60, wherein the selector operates on the complete set of eigenvectors to define the set of drift-compensated principal factors as a first few eigenvectors corresponding to eigenvalues above a certain limiting value.

62. The apparatus of claim 53 wherein the principal-factor determinator comprises a linear-least-squares analyzer.

63. The apparatus of claim 62, wherein the linear-least-squares analyzer selects a set of initial factors from the set of drift-compensated row vectors of the drift-compensated array, performs a linear-least-squares decomposition with the set of initial factors on the drift-compensated row vectors in the drift-compensated array to provide a set of residue factors, and performs a Gram-Schmidt orthonormalization on the combined set of initial factors and residue factors to provide drift-compensated principal factors.

64. The apparatus of claim 53, wherein the profile generator defines a set of drift-compensated target factors on a space of the drift-compensated principal factors determined by a target-factor constructor operating on the drift-compensated

principal factors, applies the set of drift-compensated target factors to a profile trajectory lying within a space of drift-compensated principal factors to obtain a sequential set of target-factor weighting factors corresponding to the drift-compensated target factors for the profile trajectory, and outputs to an output device analytical results selected from the group consisting of a set of drift-compensated scaled target-factor profiles derived from the set of target-factor weighting factors, and the set of drift-compensated target factors.

65. The apparatus of claim 64, wherein the target-factor constructor generates a profile trajectory on a 3-dimensional projection of a 4-dimensional space of a set of first-four, drift-compensated principal factors along with a reference tetrahedron the vertices of which represent each of the first-four, drift-compensated principal factors; encloses the profile trajectory within an enclosing tetrahedron with vertices centered on end-points and in proximity to turning points of the profile trajectory, and with faces lying essentially tangent to portions of the profile trajectory; and calculates the drift-compensated target factors from the normed coordinates of the vertices of the enclosing tetrahedron in terms of the drift-compensated principal factors.

66. The apparatus of claim 65, wherein the target-factor constructor in generating the profile trajectory further calculates 4-space coordinates of a profile trajectory of drift-compensated target-factor profiles on a 4-dimensional space to produce four coordinates for each point in the profile trajectory, one coordinate for each of the first-four, drift-compensated principal factors; reduces the dimensionality of the coordinates of the profile trajectory by dividing each coordinate by a sum of all four 4-

space coordinates to produce normed coordinates for the profile trajectory; and, plots the normed coordinates for the profile trajectory in a 3-dimensional space the coordinate axes of which are edges of a reference tetrahedron the vertices of which correspond to unit values for each of the first-four, drift-compensated principal factors in a manner analogous to plotting of coordinates on a quaternary phase diagram.

67. An article of manufacture comprising a program storage medium readable by a computer, the medium tangibly embodying one or more programs of instructions executable by the computer to perform a method for compensating a plurality of sequential spectra and profiles derived therefrom for effects of drift, the method comprising:

transforming a plurality of sequential spectra obtained from a spectrometer to provide an array of drift-compensated row vectors, wherein the array of drift-compensated row vectors constitutes a drift-compensated array;

performing a principal-factor determination on the drift-compensated array to provide a set of drift-compensated principal factors; and,

generating drift-compensated scaled target-factor profiles from a profile trajectory of the drift-compensated row vectors lying within a space of drift-compensated principal factors.

68. The article of manufacture comprising a program storage medium readable by a computer, the medium tangibly embodying one or more programs of instructions executable by the computer to perform a method for compensating a plurality of sequential spectra and profiles derived therefrom for effects of drift, the method of claim 67 further comprising generating drift-compensated compositional profiles from the set of drift-compensated scaled target-factor profiles.

69. An article of manufacture comprising a program storage medium readable by a computer, the medium tangibly embodying one or more programs of instructions executable by the computer to perform a method for compensating a plurality of sequential waveforms and profiles derived therefrom for effects of drift, the method comprising:

transforming a plurality of sequential waveforms obtained from a waveform-source device to provide an array of drift-compensated row vectors, wherein the array of drift-compensated row vectors constitutes a drift-compensated array;

performing a principal-factor determination on the drift-compensated array to provide a set of drift-compensated principal factors; and,

generating drift-compensated scaled target-factor profiles from a profile trajectory of the drift-compensated row vectors lying within a space of drift-compensated principal factors.